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TI Total sputtering yield of Ag/Cu alloys for low energy
argon ions
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AB Measurement of the total sputtering yields of Ag/Cu
two-phase alloy targets for normally incident 200 and 100 eV Ar⁺
ions were performed. The dose was .apprx.10¹⁹ ions and the target
temp. was held at .apprx.20.degree.. A graph of total sputtering yield
vs. Ag/Cu (at.%) compn. is V-shaped with the yield of
all compns. being lower than either pure Cu or pure Ag
The total sputtering yield is defined as the no. of sputtered atoms of
any type divided by the no. of incident ions. The total yield was calcd.
assuming stoichiometric component ejection during the entire bombardment
time. The validity of this assumption and its effect on the results is
discussed. The surfaces of the sputtered targets were covered
with a variety of pronounced cones, ridges, and pebble-like features. It
is hypothesized that a redeposition shadow effect is responsible for the
lowered yield. When the developing surface features or projections
become
tall enough, material ejected from one projection will be redeposited
onto
neighboring projections resulting in a reduced sputtering yield. The
V-shaped yield vs. compn. curve is very similar in structure to the
Ag/Cu solidification curve in the Ag/
Cu phase diagram. A plausible explanation for this correlation
follows from the fact that the av. crystallite sizes of the alloy compns.
scale with the solidification curve. Compns. with the lowest melting
temp. have the smallest av. crystallite sizes. The smaller the
crystallites the faster they will be covered by the yield lowering
surface
projections. Selective sputtering and surface diffusion fed seed cones
appear to be the two most important mechanisms contributing to the
formation of the roughened surface topog.